CHAPTER 2

PRODUCTION-ORGANISATION: THE TECHNOLOGY OF MULBERRY PLANTATION, THE COCOON-GROWING CULTURE, WINDING AND WEAVING OF MALDA AND MURSHIDABAD.

There were two kinds of Silk, viz., mulberry silk and non-mulberry silk. The mulberry silk was commonly known as silk and it was largely cultivated at Malda and Murshidabad, and the economy of the people there was greatly influenced by it. The non-mulberry silk comprised Eri, Tasar and Muga. It was cultivated outside Bengal specially in Assam, Bihar, Orissa and Madhya Pradesh. The eri silk was cultivated mainly in Assam and to some extent in Bihar and Orissa. Tasar was cultivated in South Bihar and the adjoining districts of Bengal (viz. Midnapore, Bankura and Birbhum) and Madhya Pradesh and to a small extent in Orissa. The muga silk worms were reared only in Assam. The non-mulberry silk industry mainly gave occupation to adibasis and hill tribes. The eri silk worms were reared on Castor leaves and were domesticated like silk-worms. The tasar and the muga silk-worms were reared on asan, sal and oak trees.[1] Both the mulberry silk and non-mulberry silk belonged to the natural silk category and India was the only country that produced four commercially known varieties of natural silk (mulberry, tasar, eri and muga).

Silk industry was divided into four heads - (a) Moriculture, (b) Sericulture, (c) Silk winding and (d) Silk weaving.

As cocoon growing was much more profitable than any other agricultural products, a proper care was always taken for its culture so that the crop could be assured. For the success of cocoon-rearing, the following criteria were generally followed -

i) A proper care was always taken in the culture of mulberry and mulberry must not be cultivated repeatedly in the same spot.

ii) The superior cocoon of European, Japanese or Chinese (i.e. Bombyx mori) variety were cultivated.

iii) Precautions against silkworm diseases were taken so that the silk worm epidemics might be avoided.

iv) A fewer 'bunds' or crops were generally cultivated instead of many.

v) A better and more liberal treatment in the culture of silkworms were observed.
However, cases of violation of these principles were not infrequent.

I

MORICULTURE:
The soil of Malda and Murshidabad was suitable for the cultivation of mulberry and it was cultivated 'as bush', dwarf or tree' for growing silk worms. Mulberry lands were of two kinds, known as dishi tut and mathal tut. The first was high land near the village, and was particularly favourble to mulberry cultivation. Mathal tut was highland in the open, away from the villages; it was not so strong as the dishi tut.[2]

Mulberry was a perennial and profitable crop, and it grew in all kinds of lands or soils. Therefore, the best plot of land and the richest soil were preferred for its cultivation. "Clay soil lying fallow for a number of years, or soil prepared by uprooting stumps of bamboo from an old bamboo garden, is most eminently suited for growing mulberry."[3] The mulberry gardens were kept close to the house and were exposed to the full light of the Sun. Proximity to the house was necessary, for, the mulberry leaves were not only the food of the silk worms but also the fodder of goats and cattle. So, care was taken that goats and cattle did not get to eat it. It was normally encircled by a fence. The main food of the silk worms was the leaves of the mulberry tree. Hence, the first object which drew attention for the production of silk was the culture of mulberry plants.

Mulberry is a deep-rooted plant and, therefore, the cultivated land is necessarily arable and deep. The mulberry plants needed more air, moisture and minerals than the shallow rooted plants. Indian soils were classified mainly into four parts - (i) the alluvial, (ii) the black, (iii) the red and (iv) the laterite soils. Mulberry grew on all soils excepting the place which is heavily water-logged or very sandy. The laterite soils were more suitable for the growth of mulberry. The soil of Malda and

Murshidabad was both lateritic and alluvial.[4]

Mulberry plants were propagated in four ways - by seed; grafts; layering and cutting. The first one was known as sexual method and the rest three were known as a-sexual or vegetative methods. Mulberry was propagated mainly through cuttings and the aim of this method was to obtain higher yield and to stabilise the crop.[5] The mulberry tree that grew from seeds usually produced thinner leaves than those from grafts or cuttings. The thin leaves were useful in the early stages of rearing the worms. But in the later stage, the thick leaves were preferred, provided they were succulent.

The wide cultivation of mulberry plants was a common feature in the rural scene of Malda and Murshidabad district. It gave occupation to the villagers and the peasants who fed their own silk worms and gave full employment to their families.[6]

Cultivation of mulberry plants was carried on either alone or with other agricultural crop. As the product of sericulture was always uncertain, so the peasants had to depend on other agricultural production . Even today the villagers of Malda and Murshidabad, connected hereditarily with sericulture, also had other agricultural pursuits along with it.

The cuttings of the mulberry trees were planted in wet season, whenever a 'new field was required and cuttings were obtained from the prunnings of the trees. Adequate care was taken in the cultivation of mulberry. The field was ploughed and nicely hoed and fertilised with manure in preparation for planting. It took six months or more, according to climatic conditions, for harvesting the useful leaves. The mature stalk of mulberry, not thicker than a man's thumb, was cut by a billhook into pieces about a 'span'[7] long, placed in a hole, covered from the sun and watered regularly until at the end of a fortnight they began to vegetate. Then the cuttings were transplanted into the holes of the field. The holes were one 'span' deep and the distance between the holes would be 1½ to 2 feet and the plants were laid down in lines. The lines were marked 18" (inches) apart along

side. Mulberry cultivation resembled that of tea. The principal centres of cultivation were called 'juars.' The mulberry land was opened with the spade in the cold season and the ground was well broken with the plough upto one 'cubit'[8] and levelled with the ladder. The dug up land was to be left untouched until May and after the first rain the land would be ploughed both length and breadthwise. In June, July and August ploughings were also done once in a month. In September or October when the rains were over, three or four ploughings and ladderings (horrowings) were required to make the land cultivable. Four or five cuttings were placed in the hollows (made with the spade) obliquely so that the buds looked upwards. The cuttings would not grow if planted upside down. The cuttings were planted in September and October in Malda and Murshidabad side. It was generally found that in the good soil the mulberry trees lasted for ten years, and in the poor soil the plants would last for four to five years. But sometimes the mulberry fields existed even upto 40 years. Usually not more than 2000 plants and not less than 1000 saplings were planted in a bigha. There was a belief that the first crop became poisonous, so should be avoided in feeding the worms. In the last stage of the worms, the first leaves were not given as it produced grasseri. The first growth of leaves was called '<u>naicha</u>.' The first leaves were used for cattle feeding.[9]

The Hindus and Mahommedans of Malda and Murshidabad used to cultivate trees and rear the silk worms. Though the fact remained that the rearing of the silk worms was mainly done by the Mahommedan community, still it was also practised by the different low castes of the Hindu community. It was by no means inevitable that the same person had to cultivate mulberry and rear the worms which would feed on it. In the medieval period the mulberry cultivators were mainly Hindus and the rearers were Mahommedans. Then the rearers had to purchase leaves from the cultivators. Even today, this process was continuing in some areas of Malda and Murshidabad. Some grew mulberry without any intention of rearing. This position had changed and there are evidences to indicate that some persons started simultaneously cultivating mulberry in their own land and rearing silk worms in

their dwelling houses. Gradually, a large number of the mulberry growers combined silk worms rearing in their profession. Almost all the mulberry growers also combined the cultivation of mulberry with other agricultural pursuits. In my field study at the villages of Malda and Murshidabad, I found that the mulberry planters were not absolutely depending on the cultivation of mulberry even now. Each of them had to perform agricultural activity as a subsdiary source of income. "The production of sericulture proper was an agricultural home industry. Along with other agricultural crops, the peasant cultivators grew mulberry trees and reared silk worms in their houses on the mulberry leaves."[10]

As mulberry was a costly product and there was every uncertainty in the rearing of silk worms, so the farmers and rearers had to depend on 'dadan'. They got advance form the 'Mahajans' or the 'dallals' and the 'pykars'. The money-lenders were eager to give advance in exchange of silk and the rearers had to sell their products to them. The Company with the help of the intermediaries used to supply advance and collect and purchase the products from the producers. So, the small producers were always found to be in the 'vicious circle' of advance system. It was not possible for them to rear silk worm and cultivate mulberry by themselves. It was left to the well off amongst the villagers who had necessary resources for ploughing, manuring and maintaining bullocks for the cultivation of mulberry and erecting adequate house for silk worm rearing to undertake the burden of the industry. Not withstanding this fact, in comparison with the standards of the then affluent society, they were nothing but poor.

The cultivation of mulberry was the agricultural part of sericulture. Sericulture further was comprised of silk worm rearing and silk breeding. Mulberry played a significant role in determining the production cost of cocoons and silk, as it was estimated that 60 per cent of the cost of cocoons went to silk.[11]

The production of mulberry leaves varied from place to place. Buchanan reported that in Malda the average production of leaves

was 82½ seers, whereas in Purnea it was 171 seers.[12] The price of a basket of leaves differed at different times from 1 to 30 rupees.[13] The silk worm rearers of Malda and Murshidabad having 3-4 bighas of mulberry cultivated lands with 8-10 family members could earn a tolerable livelihood by cultivating leaves and rearing worms. "Four bighas were sufficient to supply a breeder with the usual quantity of leaves that he required ."[14] The rivers of Malda and Murshidabad were helpful for transport. Buchanan mentioned in his report that "both cultivators and breeders should chiefly occupy the immediate vicinity of navigable rivers, so that the leaves might be transported in canoes, at a moderate expense, to villages in which the worms happen to thrive.... the banks of the Mahananda are peculiarly favourable, and were they cultivated with care, from the Kalindi to the Punabhaba, might probably supply all Bengal."[15]

Mulberry was a hardy tree and was of easy growth. The leaves of the white mulberry were liked by the silk worms due to its tenderness. Then came the red mulberry. The black mulberry was in least demand due to the harshness of its leaves. The leaves of the Alba i.e., white fruited mulberry were taken eagerly by the silk worms. The white mulberry tree was of quicker growth. The constant plucking of leaves did not injure the trees.

The filament of the white mulberry cocoon was finer than that of the red and black mulberry cocoon. The quality of the filament of the cocoon was also influenced by temperature. "The quality of the filament does not solely depend upon the food of the insect, but it is also influenced by the degree of temperature in which it is reared."[16] In cold climate, the black nigra i.e., the black fruited species throve better than the white mulberry. The leaves of the red species did not come out before ten to fourteen days later than those of the white mulberry. It was less subject to injury by frost and this was the reason for its cultivation. On the other hand this was the cause why it was not suitable for cultivation in other climates.[17] "If leaves of the white, the red and the black mulberry be given at the same time

to the insect, it will eat first the white, next the red, and lastly the black, in the order of the tenderness of the leaves."[18]

Though the moist land of the river side was very useful for the rapid growth of the mulberry plant, the leaves of these trees contained too much watery substance and were harmful to the worms. The worms took these leaves voraciously but the quality of their produce was affected by the weakness of constitution resulting from excess water consumption.[19] The mulberry trees planted in dry soil produced fewer leaves, but they offered greater nutrition. The worms consuming these leaves naturally produced superior quality silk. As a matter of fact, mulberry leaves, "are then to be considered as being only a mine worked by the worms; and this mine is more or less proper to furnish the fine substance, according to the soil and climate."[20]

Cuttings were the best method for the development of mulberry trees. It was the most easy and expeditious way of raising it. Though a great number of trees could not be obtained by this method as from seed, still there was a great advantage of it in point of strength as well as in rapid growth.[21]

As the leaves of the mulberry trees were the vital food for the growth of silk worms, so great care was taken for the growth of leaves. More attention was necessary for dressing and prunning the overgrown branches. It would then furnish abundance of good leaves. When the trees were young, it was harmful to strip them because leaves were the most vital organs that fulfilled important functions in plant by absorbing moisture from the air and light from the sun. In cold season the leaves of mulberry were destroyed by frost. When the winter was mild the trees brought forth leaves very early. It was better to hatch the worms in the hot climate when it was easy to get the leaves. So far as the nutrition of the mulberry leaves was concerned it was composed of five different substances- (i) the solid fibre, (ii) the saccharine, (iii) the resinous substances, (iv) water and (v) colouring matter. The leaves containing the most nutrient were supplied to the silk worms.

The fibrous substance, water and colouring matter could not alone be said to contribute towards the nourishment of the silk worms. The saccharine substance was very much essential for the development, size and health of silk worms. The resinuos substance in the leaves was necessary for getting silk proportionate to the weight of the worms. The resinuous substance was that "separating itself gradually from the leaf, and attracted by the animal organisation, accumulates, clears itself, and insensibly fills the two reservoirs of silk vessels. According to the proportions of the elements which compose the leaf, it follows, that cases may occur in which a greater weight of leaf may yield less that is useful to the silk worm, as well for its nourishment, as with respect to the quantity of silk obtained from the animal."[22]

The mulberry leaves containing adequate nutriment helped the growth of silk worms. It was better for the worms to take a few leaves of saccharine substance than a good number of malnutrition leaves. If the worms ate huge quantity of leaves they would be fatigued and were likely to be attacked by the disease. Moreover, if the resinuos substance was not found in the leaves the worms grow but not produce silk in proportion of its wieght.[23] The old mulberry trees yielded better leaves than the young ones. As the tree grew older the leaves would diminish in size, but at the same time it would materially improve so that at length it would attain to a state of very excellent quality.[24]

It was necessary to consider the age of the worms before feeding. The young worms needed young leaves and the mature leaves were to be supplied to the worms of more advanced age. The young leaves were filled with aqueous matter and helpful for the body of the young worms for its continuous evaporation. While the mature leaves contained nutritive matter had helped the older worms for its better development. "To give old leaves to young worms, or young leaves to old worms, would alike prejudicial."[25]

The greatest care was taken to prevent the leaves to be heated or fermented. The slightest fermentation would waste the nutritious substance of the leaves. It was always essential to

give the dry leaves to the worms. Otherwise, contagious and fatal diseases would occur. It was considered that a well-cultivated mulberry tree yielded in each season about 14 kg. of good leaves.[26]

It was said thatno insect excepting the silk worm would feed on the mulberry leaves. Consequently the mulberry gardens were kept free from the depredations of other insects, on the assumption that it could be exclusively devoted to the use of the silk worms alone.[27]

The mulberry leaves were plucked in the morning or in the evening only. A day's supply of leaves should be obtained in advance. So long as there was dew on the leaves, or so long as the leaves were wet after shower, they were not collected and were not fed. If it was raining continuously for two or three days, the leaves so gathered were dried by fanning. In hot climate, if the leaves became dry, they were kept normal by sprinkling a little water on it. In cloudy weather or if rain was apprehended in the evening, the leaves were collected before hand. The wet, fermented, muddy and dusty leaves were never be given to the worms. As the Silik worms increase three times in size after every moult, they require three times as much food, and at the last stage they require five times as much food as they ate during previous stages.[28] "Tender leaves of mulberry are cut up very fine and sprinkled over the newly hatched worms."[29]

Every cocoon-rearer had his own mulberry land for the rearing of silk worms. When his own supply of leaves fell short, he took leaves from non-cocoon-growers who had mulberry cultivation. Many high-caste men of Malda and Murshidabad district had lands where they used to cultivate mulberry plants. Men holding other occupation had also plots of mulberry. A bigna of mulberry in silk district like Malda and Murshidabad was considered a little fortune. Sometimes, the mulberry growers got usually high price for mulberry leaves. When the needs became very pressing at the last stage of

rearing, thier necessity made the rearers to pay willingly high price for it.[30] Though the vital food for rearing silk worms was mulberry leaves, there was also the substitute food for the worms and it was 'the osage orange, the lettuce and the tender leaves of the peepul.' In case of failure of the mulberry crops the substitute food were given in the early stage of the worms. However, the worms reared only on the substiute food could not spin cocoon, or if spin at all, the cocoon would be poor in quality. So, in the absence of mulberry leaves the tender peepul leaves were allowed for feeding the worms for sometimes, but in the later stage mulberry leaves were procured to feed the worms in order to get cocoons.[31]

The social position of mulberry growers, in comparison with the cocoon-rearers, spinners and weavers, (who had no other profession) was no doubt high. The persons who had mulberry cultivation with other profession could not be regarded as the mulberry growers.It was found that a zamindar or a silk factor had mulberry plantation for his extra income but he could not be recognised as the mulberry grower. In that case he would be treated by his principal profession. A man having two or three bighas of mulberry lands but did not rear silk worms was considered more substantial than the cocoon-rearer with two or three bighas of mulberry fields. There was always a risk in cocoon-growing as there was every chance of the cocoons being attacked by the epidemics. Mulberry-growing presumably was scarcely attended with any risk. So it was regarded as a 'safe and profitable industry.'[32]

The rent of the mulberry land was always high.The famine of 1770 swept away one third of the population of Bengal and as a result the cultivation of mulberry suffered much. The famine caused escalation of silk price. "The prices of most of the Company's assortments of silk are 80% dearer than in 1768 and the piece-goods 50 or 60%. The famine might justly cause an enhancement of about 35%."[33] In 1767, Harry Verelst, Governor

of the Bengal Council, urged the Zamindars, gathered at Murshidabad for the 'punya' ceremony at the conclusion of the revenue year, to give all possible encouragement to the cultivation of mulberry trees. In his letter on the Burdwan affairs Verelst mentioned that "the influence of government may be exerted for the encouragement of the growth of the mulberry trees, and every other means must be thought for the extension of this valuable branch of our trade."[34] The Court of Directors in their letter dated 24th December, 1776, gave instructions to the servants of the Company for rendering all suitable encouragement for the cultivation of the mulberry plants and for the increase of raw silk. They pointed out that the vast track of lands should be cleared for producing mulberry shrubs and the cultivation would promote the interest of the company and of the nation because raw silk was a beneficial article of imports and of great consequence to the manufactures of Britain."[35]

"The cultivation of mulberry was recommended in the strongest manner to the Zamindars and landholders, and all possible encouragement afforded for the clearing of such lands as would best answer the purpose."[36] The committee of Circuit recommended certain measures for the improvement and the company paid attention to the cultivation of mulberry. "It was declared that all new and waste lands, laid out and improved for the cultivation of mulberry, could be held rent free for two years and afterwards laid out at half the price of the ancient mulberry grounds of the same 'pargana' for the third year, and in all succeeding years payment was to be made at full rates, but they were to keep in cultivation the lands which they actually held at the time by their original pattas."[37] Due to the adoption of this policy, the mulberry plantations were significantly refurbished. As mulberry plantation and cocoon-growing were highly expensive and the pecuniary condition of most of the planters and cocoon-growers was not good, there was, therefore, a need in advancing money to them, and the company enhanced its silk investment so that the planters, growers and weavers, through the brokers and paikars who had a direct contact with them could resume their production

activities soon. Lakhs of rupees were advanced in the form of 'dadan'. The brokers had to take guarantee for 'investment'. In the manufacture of silk, money was advanced to the people of Malda and Murshidabad "where large tracts of low land were taken into cultivation for growing mulberry plants and for the working of the filatures. As the quality of the silk largely depended on a full supply of good and fresh leaves to the worms the demand for mulberry fluctuated according as the worms were plentiful or scarce. The worms throve best in the cold season, and hence the November band silk was better in quality and more valuable than any other type."[38]

Silk was 'reaped' three times in a year. The local name of the harvest was '<u>bund</u>'. There were three <u>bunds</u>- (1) November <u>bund</u>, (2) March <u>bund</u> and (3) July <u>bund</u>. The November <u>bund</u> was gathered from October to February. The March <u>bund</u> was gathered from March to June and the July or <u>Barsat</u> <u>bund</u> was gathered from July to September. The winter cocoon was the best in nature and hence expensive. After the November <u>bund</u> came the March <u>bund</u>, and the July or <u>Barsat</u> <u>bund</u> was the last when the cocoons became poor in quality.[39] "All the country or great part thereof about Kasimbazar is planted or set with mulberry trees, the leaves of which are gathered to feed the worms with and make the silk fine and therefore the trees are planted every year."[40]

The extensive cultivation of mulberry trees was a feature of the rural scene in Murshidabad and it provided occupation to many people, because the peasant who fed his own silk worms gave full employment to his family. It was a common saying in the Murshidabad district that mulberry is a greater source of wealth and happiness than even that of one's son. '<u>Ja</u> <u>na</u> <u>kare</u> <u>pute,</u> <u>ta</u> <u>kare</u> <u>Tute</u>.'[41]

Various kinds of wild mulberry were found throughout the Himalayan regions at an altitude of 500 to 4000 feet high. There were references in the Sanskrit literature that sericulture was carried on in ancient time by the hilly tribes and Manu in his <u>'Smriti'</u> had specially mentioned about the mountain tribe

'Pundrakas'. The cocoon-growing caste of Malda still styled themselves as 'Pundas'. They perhaps originally came from the Himalayan regions, where mulberry grew wild.[42]

In Europe, the two kinds of mulberry trees- white mulberry (Morus Alba) and the black mulberry (Morus Nigra) were preferred for agricultural purposes. In comparison with the black mulberry trees, the white mulberry trees were largely propagated. Because, the white mulberry was much better than the black one for the rearing of silk worms. The foliage of morus alba grew rapidly and remained soft, whereas the leaves of the morus nigra were hard and rough. The silk worms preferred to eat the leaves of the white mulberry trees. The cultivation of the white mulberry trees was introduced in Europe in the 12th century. Both the species originally came from Central Asia or India into China and later on into Europe.[43]

For the propagation of the several varieties of mulberry the cultivators used to seek the help of local plant experts. Where the help of an expert was not available, the following criteria were applied.

1st, A mulberry tree that yielded no fruits should be preferred.

2nd, Where all the trees yielded fruits of the same quantity, the trees that yielded small or insipid fruits should be preferred.

3rd, The mulberry trees that grew the largest of leaves should be cultivated.

4th, The trees that bore largest quantity of leaves should be preferred.

5th, The mulberry trees that grew fastest should be preferred.

6th, It was a vital thing for sericulture that the mulberry leaves should be smooth, succulent and thick and not leathery.

The takra-laga was a dangerous disease for the growth of mulberry leaves. The leaves affected by takra should be carefully avoided for feeding the silk worms. If the worms ate these leaves they would naturally be attacked by flacheri or

grasseri . This disease of the mulberry plant did a great deal of harm to the silk industry. In rainy season, the mulberry fields were badly affected by takra and the leaves remain stunted in growth. The affected leaves were unsuitable for the rearing of silk worms. After rainy season, the disease went on abating. In November, the silk worms got the fresh mulberry leaves free from this disease and, therefore, the November bund was the best for rearing the worms. Takra was caused by a minute insect which could easily be killed by kerosine emulsion, but this treatment was not known to the 17th/18th century planters.

The health of mulberry plant and the condition, quality and yeild of its leaf was an agronomical problem. "Mulberry is a factor for non pollution; it protects the soil against water (erosion) and fire (conflagration) and eventually, furnished feed for cattle."[44]

In the sixth decade of the eighteenth century, the prices of mulberry leaves were high and, so, the cultivators were able to pay as much high rent as Rs.50 per acre, charged by the Zamindars for the lands. But when the prices fell and the rent remained high, the ryots turned from mulberry cultivation to other crops. This was one of the factors that led to the decline in the production of raw silk in Bengal even in the years following the revival of silk market in Europe.

II

SERICULTURE:

Mulberry silk worm rearing was a very important industry in Malda and Murshidabad. The silk worm growing was an art in the hands of the rural people there and it was normally carried on within the dwelling houses of the rearers. The silk industry of Bengal was in existence since the 15th century, though we could not ascertain the date. Some of course would like to attribute to it a more ancient legacy but on insufficient grounds. "It is impossible to discover the date at which the silk industry commenced in Bengal, but it must be of great age."[45] The silk

industry was one of the earliest of all industries which preoccupied the servants of the East India Company in Bengal. The silk worms were indigenous and its first home was said to be in the Brahmaputra Valley."The sericultural industry of India is traceable not to China but to the Himalayan country."[46] The Punda Caste was the hereditary silk worm rearing caste and they lived mainly in Malda and in parts of Bogra, Rajshahi and Murshidabad. They were "the best, the most intelligent and the most prosperous of all cocoon rearers."[47] In Bengali, mulberry meant tunt; and the cocoon-rearers were known as tuntias, tuntia Kaibartas and tuntia-chasas.[48] The number of the Muhammedan cocoon-rearers was no doubt large. The total number of cocoon rearers in Bengal, including those who added cocoon-rearing to other profession, was about 90,000.[49] The position of the cocoon-rearers in society was higher than that of most cultivators. Cocoon rearing was limited to the lower castesamong the Hindus and the higher caste Hindus like Brahmans, Baidyas and Kayasthas considered it derogatory to rear cocoons. All the rearers styled themselves as 'Bosni.'

The most ancient naturalist Aristotle gave the account of silk worm and described it as a horned worm which he called bombyx that passed through several transformationsin the course of six months.[50] Three species of silk worm were mainly reared in Bengal. Bombyx textor (i.e. 'bara palu') was reared in a year; Bombyx fortunatus (i.e. 'deshi palu'); and Bombyx craesi (i.e. 'nistari'). There was also a China worm i.e. Bombyx sinensis which was also reared in Murshidabad district. It was crossed with the desi species in Kasimbazar. Bombyx textor furnished the major part of the march bund and it was considered good silk. This worm was furnished in the Jungipur Circle. Bombyx fortunatus furnished no less than five crops viz., March, April, June, July, October and November. They were not of equal value. The crops of April, June and July were the worst in quality and that of March was often precarious. The silk produced in October and November was the best in quality. Bombyx Sinensis was largely cultivated in the Jangipur Circle and yielded cocoon from January to May. Murshidabad was not self sufficient in the production of cocoons and had to import largely form other parts,

specially form Malda where Bombyx Craesi gave no less than six harvests, the best of which were in April, June, July and September.[51] The worms reared in Malda and Murshidabad districts fed on mulberry (tunt) leaves. For the quality and proportion of silk, the Chhoto palu (Bombyx fortunatus) came next to the Bara palu (Bombyx textor), though the fibre of Nistari (Bombyx craesi) was finer and softer. The Nistari was reared more than the other varieties, though it yielded a smaller proportion of silk. The quality of the principal three kinds of Bengal cocoons for textile purposes was to be marked in the figures given.

TABLE 2:1

Title : The difference in quality of the three kinds of Bengal Cocoons

	Bara Palu	Chhoto Palu	Nistari
1. Average length of fibre in a cocoon in metres	270	215	210
2. Weight of reelable silk in each cocoon in milligrammes	60	45	36
3. Weight of unreelable portion in each cocoon in milligrammes	20	16	16½
4. Proportion of reelable silk in the fresh cocoon per cent.	08	7½	06
5. Diameter of fibre (bave in millimetres	16½	20½	20
6. Average weight of test skeins of fibre (bave) 476 metres long, in deniers	$02^{1/3}$	02	$1^{3/5}$
7. Tenacity of fibre (bave) in garments	$06^{1/3}$	$06^{4/5}$	04
8. Percentage of elasticity of bave	16	12½	12
9. Percentage of loss on weight due to boiling off	24	30	25

Source: N.G. Mukherjee, A Monograph on the Silk Fabrics in Bengal, Calcutta, 1903, p.9 (para 26).

The above figures were no doubt convincing with regard to the merit of the Bara palu cocoon and the silk as compared with the other two varieties.

Three or four crops of cocoons were reared out of eight crops during the year i.e. three of Nistari and one of Chhoto palu. It was not feasible to take 8 crops though the Bombyx textor, Bombyx fortunatus, Bombyx Craesi and Bombyx Sinensis bred eight times in a year. The parasitic fly would make cocoon growing impossible if all the crops were taken in the same locality. Therefore, it was found to be good to rear silk worms in one 'joar'[52] and mulberry to the next. The seed, thus, was kept separately as one bund in one joar and another bund in another joar. The cocoon rearers went to distant joars for seed and, thus, walked sometimes 60 or 80 miles for getting good seeds. The Bachra and Bhattamati joars of Murshidabad and Dhantala Ganipur joar of Malda were famous for seed rearing and thousand of cocoon growers were used to go there in search of good seeds. Exchange of seed was also beneficial for the health of the silk worms. The principal cocoon growing bunds in Murshidabad were Aghrani (November), Chaitra (March), Srabani (July), while in Malda were Kartika (October), Baishaky (May), and Bhaduria (August).[53]

The rearing houses of Malda and Murshidabad were of thatched roof and made of mud walls. It was well ventilated and the door and windows were protected by the bamboo chick or net so that the parasitic flies could not enter into the rearing rooms. The houses were generally about 24 feet long, 15 feet broad and 9 feet high. The floor (i.e. plinth) of the house was also high. The position of the door should be on the south. Two windows were enough for a rearing room of the said dimensions. A rearing house- thus built would hold 256,000 worms i.e. 200 kahans.[54] It would be filled with 5 ghurrahs,[55] each with 16 'shelves',[56] measuring 5½ feet by 4½ feet. The dalas were 'leaped' with cowdung. Each dala contained 3,200 silk worms i.e. 2½ kahans. The dalas were supported by bamboos resting on earthen saucers filled with water to protect the silk worms from ants.[57]

At the young stage of the silk worms, the fine cut up mulberry leaves were given for feeding, and when the worms grew the larger leaves were supplied; and in the third and last stage, the entire branches would be placed on the shelves of the worms. The silk worms were at least fed four times a day. Silk worms required cleanliness and it was a vital factor for the healthy growth of the worms. Fresh supplies of leaves were reuired at every four hours. Dirty and stale leaves should be cleared away form the dalas. The cleaning was effected before the midday. It was said that a dirty rearer would never be prosperous as the silk worms needed cleanliness and attention. With the growth, the silk worms began to change skin and with each change slight change of colour appeared to be seen. When the time of the change of skin was approaching the silk worms became sluggish and did not feel any interest to eat leaves. At the time of moulting no food was given. For safety the moulting worms were placed on the shelves apart from the rest. The period of larval stage was nearly four weeks. If a silk worm died, it was at once removed from the shelf and that part of the shelf was sprinkled with lime. When the silk worms were ready to spin it became translucent and changed from " a greenish cream to a mellow light orange colour" and started to spit out silk form the mouth. This time, the worms were placed on the chandrakies[58] for spinning. At night a lamp was kept burning, because in the dark the worms tended to slacken off and spinning was thus delayed. "The average time taken for cocoon spinning is 56 hours."[59] When the spinning was completed, the cocoons were removed form the chandrakies and spread out on the shelves. Those required for seed should be kept separate and the rest were to be exposed to the direct heat of the sun for the killing of the grub so that the moths could not come out by cutting and spoiling the cocoons.

The refused mulberry leaves and the droppings of the silk worms were cleaned regularly from the rearing-house. These excretas were never allowed to get dry. It was left in a litter basket attached to the cowshed. The falling of cattle in it would prevent the litter from getting dry. Dry litter would create

dust and the dust mixed with air would enter the rearing-house and cause disease to the silk worms. So, the litter-basket was carefully preserved and after the dirt having rotted well, it was used as manure in the mulberry fields.

The moths, male or female, were called chakra - chokri. The moths cut its way out quickly. It commenced in the early morning and made its way out by noon. The females were larger and fatter than the males, because of eggs and not so active as the males. The sexes were separated two or three hours after their emergence. The females laid about 400-500 eggs and soon after, the moths died.[60]

There were four stages in the development of silk worms. "Mulberry silk-worm passes through four distinct stages in its life. The moth lays eggs (1st stage) from which tiny larvae or caterpillars (2nd stage) hatch, feed on mulberry leaves, grow and spin cocoons when fully grown; inside the cocoon the caterpillar transforms into pupa (3rd stage), and the pupa develops into a moth (4th stage), which cuts an opening through the cocoon, emerges from it and lays eggs again, so continuing the cycle. The time taken to complete the cycle depends on the nature of the silk worm and the climate."[61]

The best silk came from the univoltine silk worms which passed through one cycle in a year. These silk worms were generally reared in cool climate. But in tropical climate the multivoltine races were reared and they gave 5-6 crops a year. Each cycle lasted for about six weeks. The period was lengthed in cold season.

When the larvae appeared the trays were covered with perforated paper and fine chopped mulberry leaves were spread over the covering. The worms began to crawl through the opening and fed on the leaves. The silk worms required careful nourishment for 20-35 days and during this time they felt a voracious appetite excepting the four periods of slumber lasting a day at a time. This time the silk worms refused to eat leaves. On awakening

from slumber, the silk-worms shed their old skins and then started feeding. After the fourth or last moult the silk worms took the final feed lasting 7-10 days with great avidity. During this time the silk worms grew rapidly and reached their full development and, therefore, number of trays were needed to hold them. The silk worms gained in weight about 10,000 times during the whole feeding period. It became 5 to 9 cm in length when fully grown. In this stage, the silk worms turned into creamish -white caterpillar, nearly transparent and filled with liquid silk. Its aversion to eating and constant restless movement of head from side to side indicated that the silk worm was ready to spin cocoons. The 'ripe' worms were taken form feeding trays and were placed on spinning trays for making cocoons. The silken case spun by larvae was an oblong object and its size was 2.54 cm x 1.25; weight o.42 g including pupa.[62]

The best quality of cocoons were preserved for seeds and the others were 'subjected to a treatment whereby the chrysalises were stifled' without damage to the cocoons. Suffocation was done by exposure to the sun, or by steam, or by hot air. The last method was the best method and it gave the best results.

The silk worms needed a proper space at the time of spinning inasmuch as inadequate space led to the formation of double cocoons[63] from which 'raw silk popularly called dupion was produced.'The thread of the double cocoons became fluffy and , therefore, became difficult to reel. It was used for obtaining seed. The formation of double-cocoons was rare at Maldá and Murshidabad. It was common in Japan and China and in Europe. It was seen that the tendency of forming the double cocoons was hereditary.[64]

As the silk worm is a species of caterpillar and undergoes a variety of changes, it increases its size within a short space of time. Its weight also multiplied many folds in course of one month. The silk worm have sixteen legs in pairs. The first six legs are covered with scale and placed under the first three rings. The other ten legs are called holders. The holders were membraneous, flexible and attached to the body under the rings. These are also furnished with little hooks. These hooks assist

the worms in climbing.

Like other caterpillars, the silk worm is not a warm-blooded animal. Its body temperature is always equal to that of the atmosphere in which it is placed. The number of eggs produced by the female moth varied in numbers. some accounted 250, while others reckoned 400 to 500. This varation had happened due to the circumstances of the place where the sericulture took place.[65]

Climate played an important role on sericulture. Fresh air and cleanliness in the rearing room were necessary for the healthy growth of silk worm. The number of worms under rearing was necessarily large and they were more or less crowded together. So, a proper ventilatiion in the rearing room was indispensable. If the rearing room became stuffy it would affect the health of the worms and the worms would be attacked by the diseases. The silk worms took breadth through nine pairs of breathing holes opening on the body. The lack of fresh air, high and low temperatures and high and low percentage of humidity in the atmosphere created an adverse effect on sericulture.

Since the Silk worm was a cold-blooded animal, therefore, temperature played a vital part on its growth, fecundity and mortality. "The optimum temperature in cocoon rearing is 30°c from the 1st to the 3rd instars, 25°c in the 4th instar and 20-25°c in the 5th instar."[66] Cocoon growing at these temperatures was always useful for the decrement of duration of the larval stage and the mortality. It also helped to increase the weight of cocoons as well as production. The suitable temperatures for the rearing of silk worms in all stages should be 75°F. It might range from 70° to 80°F. When the temperature in the atmosphere became low or high of these ranges, the silk worms were bound to suffer unless arrangement could be made to keep the rearing room warm or cool as necessary. Both in very high and low temperatures eggs would not hatch, silk worms would not feed, grow and spin cocoons properly.[67] The temperature of the rearing room was kept at about 23°c and humidity between 65 and 75%.[68] Without suitable climatic conditions, it was

impossible to produce silk. Variations in temperature were fatal to the rearing of the silk worms. The climatic condition of Malda and Murshidabad offered a suitable position to the rearing of the silk worms.

The silk worms were able to resist high humidity at the early stage. But in the advanced stage, high humidity combined with high temperature affected the silk worms and caused mortality. At the time of spinning, high humidity reduced the quality of the cocoon.[69] When the humidity was too low the air became too dry. It caused the mulberry leaves dry up quickly and, thereby, added troubles to the silk worms. The worms did not grow well, spin only small cocoons and the eggs did not hatch well. If the humidity in the atmosphere was too high, the worms became fat, attacked by the diseases and the silk formed fluffy texture which was difficult to reel. If there were high temperature and high humidity in the air, it was bad for the silk worms more than high temperature combined with low humidity or low temperature combined with high humidity.[70] The humidity and temperature of the work-room had a great impact on the quality of the silk produced. Nature favoured Malda and Murshidabad in this regard.

Light was also a factor for the hatching of the silk worms. Hatching usually occured in the morning. In dark, emergence became slow and irregular. But sudden illumination caused rapid emergence. In my field study in the villages of Malda and Murshidabad the silk growers admitted that they got a good result by illuminating a bulb at night in rearing room. "The most effective illumination for synchronisation is a periodic light and dark regime consisting of 12 to 18 h light and 6 to 12 h dark."[71]

Dr. Buchanan estimates the yield as follows:- In Dinajpore, on the Mahananda, particularly in the Malda region 2½ seers (of 88 sicca) of cocoons produced 15 sicca weight of silk or 6.8 percent. More to the east, on the Karatoya, the yield was said to be $2^{10}/_{16}$ seers to 28 seers of cocoons, or just 4 percent.[72] Mr. Monkton, however, put it at one-eighth the weight of the

cocoons, or 12.5%. In the then district of Purnea west of Malda the yield was 1 in 17½, or 5.7%. The papers published with the report of 1836 ofcourse did not give any full information as to the yield of silk from the several species of cocoons. The Sonamukhi Resident, however, calculated the yield of 103,500 kahans of cocoons of the annual species at 150 factory maunds of silk, a kahan being 1,280. This would show that it took 903,200 cocoons to yield a factory maund of silk. Mr, Shakespear also furnished the following figurs: 48 kahans (61,440) of cocoons of the October, November, or January bunds yielded 2 seers 12 chattaks of silk, 24 kahans (30,720) of the annual cocoons yielded 2 seers four chattaks. In the March bund 45 kahans (57,600) of the small cocoons yielded 2 seers 2 chattaks of silk. These figures assuming Mr. Speed's calculations as to weight of cocoon would give an yield of 8.3% on weight of cocoons for the small size, and 9.4% for the annuals.

According to Mr. Speed cocoons on the fifth day required to make a seer of 80 sicca weight was deshi 2,080, Madrasee, 1,760, annual, 1,280 i.e., 256,000 desi cocoons would weigh 123 sicca seers. The yield of these 123 seers had been set down at 11 seers 1½ chattacks 'by customary limit,' and 13 seers 11 chattacks 'by private accomplishments'. So , for the annual cocoons he gave an yield of 8 seers 13 chattacks by 'customary limit' and 10 seers 8½ chattacks 'by private accomplishment' from 157,000 cocoons weighing 122 seers. The case of the Madrasee cocoons could not be made out clearly. However, a percentage calculation of yield per seer gave us some idea. The yield assumed to be desi 9% 'by customary limit' and 11.1% 'by private calculation' an annual 7.2% 'by customary limit' and 8.6 'by private accomplishment'.

A. Ramsay, in his examination before the Select Committee of the House of Lords in 1830 stated that the quantity of spun silk to be obtained from Bengal cocoons would be only 5%. But figures given by W.Princep in 1832 had contradicted Ramsay's assumption. Princep was of the view that 1 maund of 80 sicca to the seer (annual) yielded 3 seers of silk i.e., 7.5%; 1 maund (desi)

would yield $2^{1/4}$ seers of silk i.e., 5.6%. Later, another estimate was given by Turnbull of Ghattal to the effect that annual yielded 5.6 to 6.9% of silk, Madrasee, 5 to 6.25%, desi, 5.7 to 6.25%, and China, 5.4 to 6.25%. Geoghegan mentioned that some silk which had won the Horticultural Society's medal in 1839 was reeled from annual yielding 14.3%.[73]

The gratest obstacle to sericulture was the diseases of silk worms and these diseases were of many kinds viz., Pebrine (kata), Muscardine (Chuna-kete or Calcino), Flypest (Kuji), Flacherie (Kalsira), Gatine (Salfa), Grasserie (Rasa or Jaundice), Court (Rangi, Lali) and the Dermestes Vulpines. The cocoon rearers of Malda and Murshidabad were very much aware of these diseases and they tried to fight it out so that the cocoonaries could be saved from these fatal diseases.

(i) Pebrine :

Pebrine was always a dangerous disease and affected seriously the growth of the silk worms. In the initial stage of the disease it was not possible to mark it in naked eye. It was visible when the disease was far advanced. The worms attacked by Pebrine became more and more unequal in size, some grew normally while others remained very small. They became sluggish and slow and irregular in passing their moults. Pebrinised worms became always pale and more translucent than the healthy ones. It caused a considerable mortality among them. It was a slow acting disease and took 30 days for complete development. So, the pebrinised worms died off at the last stage all of a sudden. The dead worms did not become at once rotten or soft but tended to be dry and firm.

"The most characteristic feature of the disease, however, is the presence, in different parts of the diseased caterpillar's body; but especially in its gut, of nemerous minutes oval bodies, which are the spores of the parasite which causes the disease."[74] The silk worms affected by pebrine spin cocoons but the cocoons would be flimsy and poor. The moths cut out of them would be deformed and the eggs laid by them would not hatch, if

hatch, many might give rise to diseased caterpillars. Pebrine was highly contagious and hereditary in the sense that germs present in the body of parents passed on to the offsprings. "The famous Louis Pasteur investigated it, found out the causal agent and evolved a method of controlling it by microscopic examination of the body tissue of mother moths after eggs are laid and rejecting the eggs of those having pebrine corpuscles in their body."[75] Pebrine was not a new disease. The germs of it were in India and the causal organism was in the worms all the time that began to cause disease. Now it is found that microscopic examination and cleanliness of the rearing house would help the rearers to check pebrine. The silk growers of Malda and Murshidabad were fully conscious of that.

(ii) Muscardine (Chuna-kete or Calcino) :
Muscardine was an epidemic of the silk worm caused by a parasitic fungus. It could be checked by dis-infection of eggs and all the appliances used, and rearing the worms in a clean way. Muscardine was visible to the naked eye when the disease was fully developed. When the silk worms were affected by muscardine they gradually turned into lime like in appearance. The Italian name of the disease was Calcino and the Bengali name Chuna-kete. A pale rose-colour was seen all over the body just before death. The body became limp and lost its elasticity. It ceased to move and rapidly died. Aftert death, the worms look like a piece of chalk. Like pebrine, muscardine was "always been known in Bengal." The caterpillars attacked by muscardine at its last stage would spin cocoons, but the moths would not emerge from it and on opening of the cocoons the pupae would be found white efflorescence. When the muscardine broke out, it was stopped by keeping the worms fasting for a few hours and burning sulphur in the rearing room thoroughly shutting it up.

(iii) Fly Pest (Kuji) :
The damage caused by the silk worm fly to the silk worms was not always regarded as a disease. Yet, it caused a great deal of damage to the mulberry cocoons of Bengal. The fly pest generally attacked the silk worms when they crossed the 3rd or 4th moult. If the damage was serious, the caterpillar would not spin cocoon

and if the damage was not so serious it would spin but at that stage the moth would never be formed inside the cocoon. Moreover, the cocoons thus got would be useless for reeling.

The eggs of the fly pest hatched into maggots which penetrated into the body of silk worms and killed it when they crossed the 3rd or 4th moult. If a silk worm died after making its cocoon, a number of maggots of the fly pest instead of a moth would come out of the cocoon. It would mar the rearing room and the next crop would not be possible to rear. So the rearers of Malda and Murshidabad preferred alternate rearing for the sake of healthy crops and went to distant places for the collection of good seeds. With the seed-cocoons a few maggots of the kuji came into the village and some sort of damage was always done. Therefore, the rearers did not allow themselves 'to take two crops in succession'. In each joar, the silk worm rearers reared the worms at alternate bund to avoid excessive loss from the parasitic fly and the dermestes. The ventilator and the window of the rearing room were covered by net so that the fly pest could not make any entry inside the room. To protect the silk worms form the damage caused by the fly pest, the silk rearers of Malda and Murshidabad, took every care to keep the fly out of the rearing room.

(iv) Flacherie :

When the silk worms were attacked by flacherie, the body became all black and, therefore, the disease was known to the silk rearers as Kalsira. The external symptoms of the disease were well marked. The worms attacked by flacherie became sluggish and motionless. Flacherie generally occured when the silk worms became full grown and were about to spin. Then the worms used to vomit and it was a clear brownish liquid. The disease was always known to Bengal. The mulberry leaves affected with tukra caused flacherie or grasserie to the worms when they ate it in the absence of proper leaf. A minute insect caused tukra, which could easily be wiped out now by kerosine emulsion.

(v) Gatine (Salfa) :

The silk worms were usually attacked by gatine in its earlier stages. It was a form of indigestion and was caused due to excessive heat or cold. When attacked by gatine, the worms lost appetite and did not like to eat mulberry leaves. There was a similarity between gatine and flacherie. In both the cases, the silk worms turned into black and putrid. Gatine was not so fatal and it did not spread so rapidly as the flacherie. If the normal temperature could be restored, the silk worms would start eating and the epidemic could be prevented. This disease was not very common to the sericulturists of Bengal.[76]

(vi) Grasserie :

Grasserie was not an infectious disease. It was caused due to the sappy conditions of the mulberry leaves and lack of proper ventilation in the rearing room. As the unsuitable food and faulty ventilation were the main causes of the grasserie, so the improvement of the rearing room and proper care of feeding helped to prevent an out-break of the disease. Like flacherie, the grasserie was also the result of climatic condition. As climate could not be changed so proper care was always taken by the rearers, and the silk growers of Malda and Murshidabad were also aware of this inasmuch as grasserie was more harmful to silk worm than flacherie. Grasserie attacked the silk worms at its larval life, usually after the 4th moult and when attacked the silk worms became restless and turned into yellow colour. "If the mulberry could be grown and used at such times, the bad effects of very succulent leaf would be avoided."[77] The disease was also known as Rasa or Jaundice to the rearers. So the rearers of Malda and Murshidabad used leaves from large mulberry trees and avoided the use of shrub leaves as far possible. In Bengal, more loss took place from grasserie than from flacherie.[78]

(vii) Court :

It is not a disease. It was a symptom of disease and caused from pebrine. So the use of good seeds had helped the silk rearers to avoid that. "Court, called in Bengali Lali, Rangi or Kurkutte, is more an abnormality than a disease."[79] The court was more common

in the month of February and March. When the worms were given 'naicha'[80] leaves or leaves from the shady places, or given an insufficient supply of leaf at the last stage, this abnormality was seen amongst the silk worms. When the worms were affected with Court they turned chrysalises. At this stage it did not make cocoon or if they did it at all, the cocoon became flimsy. The chrysalis might turn into a moth but the eggs laid by it were not free from Court. It was hereditary.

(viii) The Dermestes Vulpinus :
It was a kind of beetle and ate up silk worms in all its stages. This pest took shelter in the cocoon godowns and came with the seed cocoons. So the seeding was done outside the rearing room. The appliances were always kept clean so that the epidemic from pest could naturally be checked.

The silk growers of Malda and Murshidabad generally had no prejudice in rearing silk worms. "In Malda there was no objection on the score of caste to sericulture or to mechanical or agricultural occupation."[81] But the worms were believed to be surrounded by devatas and hobgoblins. At one time, of course in early twentieth century, there was a belief among them that the use of microscope caused a cholera and, so, they were reluctant to use it. When the rearers came to realise that the microscopic experiment was helpful for detecting pebrine, then they gradually became habituated in the use of that. So was the case in the use of sulphur. The rearers believed that they would incur a curse if they used sulphur for fumigating their rearing rooms and appliances. The burning of sulphur was considered an act of profanation by 'pundas' of Malda inasmuch as they believed this substance to be of some kind of uterine discharge of the goddess Bhagobati .[82] As soon as they realised the benefits of the experiments, they gave up these superstitions. But the rearers maintained rituals and practices in rearing the silk worms as they treated the worms sacred. It was neither 'noisy, dirty nor dangerous.' when the silk worms were attacked by the diseases or when their normal growth retarded, the rearers used to abstain from carnal pleasures and offered prayers for their healthy growth. At this time, the rearers would neither wash nor be shaved. They also maintained restrictions in their diet and

did not take 'fish, turmeric, garlic and onions.' Snuff and tobacco were also forbidden. An old shoe was hung on the door way of the rearing house. The polluted women were not allowed inside the rearing room; and "women, parturient or menstruating were forbidden to approach the sheds."[83] The silk worms growers were very particular in maintaining the sacredness of the rearing house and they knew that the success of silk worm rearing depended on their urge and interest and, therefore, they found in it a real cohesion between man and insect. They fully identified themselves with the silk worms' life and seri-culture was a pleasure and job satisfaction to them. No alergic reaction was reported from the use of silk and, infact, it would protect human body against the ionizing radiations.[84] So, Sericlultural interest of the rearers helped them not only to give good silk, but it also made an impact on their health too.[85]

III

SILK WINDING :

The silk worm in its ripe stage was put into the Chandrakies[86] for making cocoons and after the spinning was over the cocoons were taken from Chandrakies by the silk growers for the use of seed, sale and winding. The healthy cocoons were, always, kept for seed and the silk rearers travelled 30 to 40 miles for getting that from village to village and joar to joar. The rearers, sometimes, took the cocoons to the nearer hat (weekly market) for sale and, sometimes, the paikars or agents of the European filatures used to come to purchase that from the houses of the rearers. The cocoons meant for reeling were kept in the sun for a few days to kill the grub by sun heat. It was also done by steam heat, when the sunlight was not available. Whether the chrysalises were alive or dead, the cocoons were placed in basket and the basket was placed on the basin in which water was kept boiling. The whole was covered with a blanket or a thick cloth. After about half an hour the steamed cocoons were ready for reeling.[87] Oven heat was better than the sunheat as it made the cocoons easier to reel. The ovened cocoons were not sprayed out in the sun to get dry. They were kept indoors in machans (bamboo shelves) and reeled off within 3 to 4 days. "The Sun, scorching as it is in Bengal, burns the thread, weakens it,

crisps it, tarnishes the colour of the silk, and renders it worse in the hand of the dyer. The heat of the oven, by which the worm is killed within the space of one or two hours, helps to strengthen the substance of the gum. The worm being sweated by the heat of the oven, the remainder of its gummy substance, which oozes through the threads of the cocoon, gives a greater degree of consistency to the silk."[88]

The pierced cocoons could not be reeled in the same manner as the whole cocoons with dead chrysalises inside them. The rearers of Malda and Murshidabad made four to six harvests each year to rear cocoons and, thereby, used five or six kahans of seed each time. Thus, after seeding i.e., after the moths cut out of the cocoons, a large number of empty cocoons had accumulated in every rearers house and these pierced cocoons were spun into a coarse thread and utilized for 'matka' cloth. Usually, the poor Mohammedan women were engaged in matka-spinning. "Matka-spinning and matka-weaving give occupation to the poorest of women and the leat artistic among the weavers."[89] The mulberry cultivators of Malda and Murshidabad were generally cocoon-growers, and, the cocoon-rearers were also generally silk-winders. This 'cross-division' in sericultural industry was anavoidable.

Two methods were applied in silk reeling. One was country wound silk and the other was filature wound silk. More than half of the cocoons were spun into thread by the country method of reeling. This was known as Khamru, Khangru or bank silk. Bank was the name of the machine by which Khamru silk was made. This machine was commonly known as ghai. The ghais were chiefly worked by Mahommedans but silk winding in the indigenous method was also done by the Hindus. Mud, bamboos, wood and iron were mainly used in the construction of ghais.

Each ghai had a reeler (katani) who sat in front of the basin and looked after the boiling cocoons and the reeling of them. Ghais, Karais or basins were warmed by the fire place. A pakdar or winder stood on the far side of the basin and turned the handle of the reel. Bantikals were placed near the katanis. This consisted of a block of wood to which an iron portion was fixed.

The arc-shaped portion had two, four or six holes according as two, four or six skeins of silk were reeled off at a time. Through these holes, the fibres from a number of cocoons in the basin were passed and carried on as a single thread to the reel. The reeler first boiled the steamed cocoons in the basins and worked them with a bundle of sticks.The cocoon should be dipped in the boiling water and its end attached to the brush. The end was taken with the left hand, and with the right hand the cocoons were lightly shaken so that a greater length of the fibres worked off. Ten or twelve cocoons were separated from the lot of the cocoons in the basin and the ends of which were passed through the eyes or holes of the kal. There were usually two upright wires on the kal to keep the two lots of fibres separated during the reeling. These served to give two croiseurs to the fibres, one, between the holes of the kal and the upright wires, and the other between these wires and the reel. The friction caused by these croiseurs agglutinated the fibres together and made them pass on to the reel as to firm and single thread. Crossing the threads before being passed on to the reel was a European innovation introduced in Bengal in 1770, and it was still rather the exception than the rule in the reeling of Khamru silk. The pakdar turned the reel and the cocoons in front of the reeler bagan to work off. The reeler marked and separated the cocoons entangled or jumbled up and supplied the new cocoons and the reeling was going on. When there was any break in reeling the pakdar helped the reeler in continuing the work.When one lot of cocoons was finished, another lot was supplied and the reeling was going on until the day's work was done.[90]

In khamru reeling the reelers did not take any trouble to find out the end when there was a break and put a knot as was done in European filature. But the union was effected and, so, it was difficult to unwind a skein of khamru silk than a skein of filature-reeled silk. Khamru silk was much coarser and uneven than filature-reeled silk. "The silk being wound from the cocoons, and reeled into skeins after the crude manner

immemorially practised by the natives of India" was inferior in quality and was known as "country wound".[91]

In filatures, 4 - 6 cocoons were usually used to reel off together to form a single thread, but in native ghais 8 to 20 cocoons were used. Selective cocoons were used in European filature, but the cheaper and rainy season cocoonswere chiefly used for the ghais. The ordinary price of khamru silk was Rs. 10 to 12 a seer. The khamru silk of Malda had a great demand to the local weavers and a good deal of khamru silk was employed in local looms. Half of the total quantity of khamru silk produced in Bengal was taken away by dealers from Benares, Nagpur, Karachi, Mysore, Sholapore and other parts of India where the silk weaving was done. A small quantity of filature-silk was used in Bengal looms. The weavers of Murshidabad called filature silk 'Latin silk' due to its improved "Novi"[92] pattern introduced by the Italian experts in the English East India Company. The weavers used the 'Latin silk' only for some exceptionally fine silk muslin fabrics and for which they paid Rs. 17 to 20 per seer instead of Rs. 10 to 12.[93]

The khamru silk spinning industry was in a flourishing condition at Malda and Mursidabad. In Malda khamru reeling was in practice in all the joars, mainly in English Bazar and the villages adjacent to it. And in Murshidabad, khamru reeling prevailed chiefly in the Jungipur and Kandi subdivisions. "Malda produces about 2,000 maunds of khamru silk; Murshidabad about 800 maunds,.... the total quantity (in Bengal) being five to six thousand maunds per annum and the tendency has been upwards."[94] The khamru silk worked cheaper than the filature -reeled silk. A winder could wind three times as much khamru silk as filature silk. In Malda, six skeins of khamru silk were turned out at a time but the numbers of winders required less. The establishment charges of European factory were, no doubt, great. The yield of khamru silk was larger. "From a maund of green cocoons 2½ to 3½ seers of khamru silk is obtained, the out turn of filature reeled silk being about half-a-seer less in either case."[95] To the native reeler it was profitable to reel coarse

khamru silk and a great quantity of khamru silk was produced in Bengal than the filature-reeled silk. The European factors had, therefore, to face a keen competition with the native reelers and to avoid the competition they recognised the khamru silk as an article of export, and bought up large quantaties of it, re-wound it, and sent it to the European market.

Nearly all the superior raw silk to that of khamru silk was exported to Europe. It was spun both in European and Bengal filatures. The European silk factors purchased the produce of the local filatures on a contract basis.[96] The Bengal Silk Company and Messrs Louis, Payen and Company were the biggest filature owners in Murshidabad.[97] The out-turn of the European filatures were no doubt greater than that of the local filatures and the regular export of raw silk from Bengal began in 1772.

The annual average export of raw silk from Bengal for 100 years since 1773 is mentioned in the table given below.

TABLE : 2:II

Title : Export of Bengal raw silk from 1773-1875

Year	Annual average export of raw silk
1773-1792	409,000 lbs.
1793-1812	438,554 lbs.
1813-1834	982,761 lbs.
1836-1855	1,435,225 lbs.
1856-1875	1,690,836 lbs.

Source: N.G. Mukherjee, A Monograph on the Silk Fabrics of Bengal, Calcutta, 1903, P.32.

It was seen in the table that the average export of raw silk was greater at every succeeding 20 years. Raw silk for export was made in large factories and the main differences between the khamru and filature systems were: (i) In filature the boiling of water was

done from a Central boiler with steam, but in khamru a fire was kept under each basin to heat the water. (ii) In filature method, the winders had to go under strict discipline and a constant watch was kept on their work and that made the silk turned out of evener size than khamru silk. (iii) A knot was put when there was a break in filature silk but that was not done in khamru silk. (iv) In filature reeling crossing of two threads were done to give them firmness and roundness, but in khamru reeling it was not done or rarely done. And, so, filature silk was finer than khamru silk.

Though the filature winders and spinners were both the Hindus and Mahommedans, the percentage of the Mahommedans was more than the Hindus and they came from the lower level of the society. They worked on a system of advances and got very small wages of Rs. 4 to 6 per month.[98]

The silk twisters were also known as chambulias and they belonged to both Hindu and Mahommedan communities-usually the latter. In society they occupied an intermediate position between the weavers and the winders. They were considered better than spinners, but not so well off as weavers.[99]

There were various colours of silk and the recognised colours were deep blue, grey, red, yellow, orange, purple,sonali(golden) and asmani(sky-blue).[100] Bleaching and dyeing made the silk glossy. In the process of bleaching silk lost some weight, but it again gained a certain weight when dyed.[101]

As the filature wound silk was better than the country wound silk, similarly in comparison with the European and Japanese silks, the European filature reeled silk of Bengal was, no doubt inferior. The inferiority was caused not for workmen or machine but for the inferiority of the Bengal cocoons. The length of the fibre of a Bengal cocoon was about 200 to 250 yards, while on a Bombyx mori cocoon it was about 800 yards i.e. four times with less joinings.[102] The Bombyx mori cocoons were better than the Bengal cocoons and, therefore, the Bara palu variety were generally cultivated for the development of silk industry.

IV

SILK WEAVING:

The silk weaving industry of Malda and Murshidabad had a long antiquity and the silk weavers there were deeply connected with it and greatly benefited by it. It was not only their profession, it was an art and a matter of joy to them. The hereditary skill of the silk weavers was a legend and the use of silk was in vogue from the Vedic days. In the Rig Veda, it was stated that the use of silk cloth was a common feature in the marriage ceremony. Kshoume' basane' basa'na'-ma'gni-madhiya'ta'm :The bride was to worship the fire decked in silken cloth.[103] A common practice grew to the Hindus, all over India, to use silk clothes in every religious occasion. So silk fabrics had a great demand in the market. But in the colonial age, the silk-weaving industry got a serious set back in the hand of the English East India Company. The Company gradually took interest only in the production of raw silk and not of silk fabrics. In 1769, the Directors wished that the manufacture of raw silk should be encouraged in Bengal, and that of silk fabrics discouraged.[104] The Company sent raw silk to England to be used in the textile industry there. The indigenous silk weavers became the worst victim of that policy. The machine-made silk goods of England captured the market and, thereby, the economy of Bengal was shattered.

The weavers of Malda and Murshidabad were more depended on silk weaving than the cocoon-growers on cocoon-growing and the winders on silk-winding. Most of the cocoon-rearers were also mulberry cultivators. The 'Pundas' of Malda were the only exception and they mainly depended on cocoon-rearing. "About half the cocoon-rearers of Bengal are also cultivators in the ordinary sense."[105] The spinners were too poor to own land and, when, they were not spinning matka or working in filatures, they were usually employed as labourers. There were very few weavers who had got their own land. As they enjoyed better social position than that of the cocoon-rearers and spinner, so working as labourers was considered degrading to them. A weaver-family would suffer privation and incur debt before it chose a lower

position in society. Their economic position was comparatively better and the silk weavers as a class were more prosperous than even cotton-weavers. Silk weaving was done by adult males. Children and women asissted them in preparing the thread and fixing the warp only.[106]

The silk weavers of Murshidabad were mainly Hindus and they belonged to the Tanti Caste. Though they were the majority in number, still there were other castes who also were engaged in this industry, and they were Kaibartas, Vaishnavas, Mals, Bagdis, Chandals and Muhammedan jugis. The families of weavers were always interested in their ancestral occupation and, thereby, achieved a hereditary skill. "In Murshidabad about 15,000 persons depend on silk-weaving, and there are over 2,500 looms at work."[107] And in Malda, there were over 25,000 silk weavers and they all belonged to the Tanti caste. Muhammedans also took part in silk weaving in this district.[108]

Malda and Murshidabad were the heart of the silk weaving industry. There were many varieties of silks woven in these districts. The principal types of Murshidabad silk fabrics were-

(i) Plain fabrics, either bleached, unbleached or dyed.
(ii) Striped fabrics
(iii) Checks.
(iv) Bordered fabrics.
(v) Printed fabrics
(vi) Banhus.
(vii) Fabrics made with naksha loom for weaving figured silks.
(viii) Embroidered and other hand-worked fabrics.

And in Malda, silk saris, handkerchiefs, sheets and pieces of coating were manufactured.[109]

The East India Company manufactured silk in three of its residencies, but mostly from country wound silk. The stuffs seemed to have been undyed piece-goods, known as corahs and bandannas. Buchanan gave an elaborate description of the silk manufacturing in Malda and the neighbourhood. The cloths made were almost all mixed, the warp being silk and the woof cotton.

The warp was generally disposed in stripes, the woof being of one colour. The pattern did not display much variety. There were said to be about 11,000 looms, but not one half of them, at the time of Buchanan's visit was constantly employed. Buchanan estimated the value of the stuffs exported to the west, to Murshidabad and Calcutta at no less than ten lakhs annually, which, of course, was a gross underestimation .[110]

Weaving was universally done in pit-loom. A few stages of preparatory work were involved before the actual weaving operation started. Preparation of warp yarn consisted of sorting the thread for different assortments and for different part of warp. Approximately eighteen days were taken to soak, rinse and dry the yarn several times before it was ready for weaving . The warp was next laid by two men, sometimes even women, over bamboo sticks which had been fixed at regular intervals in the shaded ground. The warp was fixed to the loom by two men while the reel was attached to the warp by two. It took two men ten to thirty days to fix the warp. Weaving required one or two persons,though for flowering, which was embroidered on the loom a third weaver worked on it . Ordinary assignnments were made in ten to fifteen days, The fine varieties required twenty days and the superfine thirty days.[111]

Before it was considered ready for export the silk cloth off the loom had to be processed in various ways. The requirement of washing tank or wide grounds for drying necessitated investments beyond the capacity of small dhobis. For washing a deep tank sufficed.[112] In addition to the washing grounds of the company there were those of the wealthier dhobis who rented washing ground or experienced washermen. Although the implements used for this purpose were very simple the intricacy and repetition of the process required a functional specialisation. The washing operation involved soaking the cloth in large earthenware vessels gamlas, immersing the cloth in alkaline (soap or impure carbonate soda) and drying the cloth on grass and sprinkling regularly with water.

Since the threads of the cloth were often damaged or displaced in the course of washing they had to be skillfully rearranged;

the piece was rolled and the damaged portion was brushed with a rattan comb. The darning of broken threads were undertaken by rafugar while the remaining spots and stains were removed by dagh dhobis who used the juice of amroola plant for iron marks caused during weaving, and ghi, lime and mineral alkali for other stains. After the removal of the stains the cloth was beetled or kundied with smooth chauk shells by kundigars. The colouring of silk thread was always done by specialists known as rang-rez. According to Buchanan about five hundred butidar families were employed in Malda for embroidery work.[113]

Bleaching and dyeing made the silk fabrics atrractive. Bleaching was done before weaving and the art of bleaching was in practice from the early days. It was also mentioned in the 'Institute of Manu.'[114] The silk weavers of Malda and Murshidabad were expert in the art of bleaching and dyeing. The yarn of filature-reeled silk or country-reeled silk or twisted or untwisted matka thread was to be bleached first before weaving. In the case of corah bleaching was done after weaving. The colour of the silk was yellow i.e., like cocoons from which it was made. This was not permanent colour and it was to be removed by bleaching before dyed. The silk of the Bara palu cocoons was white and it was also bleached before being dyed.[115]

The silk weavers usually performed the work of bleaching and dyeing, though there were professional bleachers and dyers in Murshidabad and Malda. The corah silks were normally bleached by dhobis or professional washermen. Men were assisted by women in the work of bleaching and dyeing. The professional silk bleachers of Murshidabad lived mainly at Khagra, Saidabad , and Kunjaghata, where the principal dyeing establishments were set up.[116]

Dyeing was done both in silk thread and silk fabrics, and before dyeing, bleaching and mordanting took place. The colours recognised in Bengal silk fabrics were: (i) Indigo, (ii) Black, (iii) Blue, (iv) Grey or light blue, (v) red, (vi) Light red or anardana i.e., pomegranate seed colour,(vii) Yellow, (viii) Orange, (ix) Cream, (x) Purple, (xi) Banesh i.e., Chocolate,

(xii) Pitambari, (xiii) Sonali,(xiv) Hiramankanthi, (xv) Mayurkanthi, (xvi) Dhupchhaya i.e. light and shadow and (xvii) Asmani. Of these colours used in Bengal silk fabrics, black and blue colours were scrupulously avoided.[117]

The colour in the silk fabric was made by the combination of different colours . Pitambari colour was produced by red warp and orange weft. Sonali colour was produced by green warp and orange weft. Hiramankanthi i.e., parrot neck colour was produced by green warp and red weft. Mayurkanthi i.e, peacock-neck colour was produced by red warp and green weft. Dhupchhaya i.e., light and shadow colour was produced by red warp and blue weft. Asmani i.e, Sky colour was produced by blue warp and red weft. The silk fabrics made of combined colours were known as shot-silks.[118]

The different colours and the excellent quality of silk fabrics of Malda and Murshidabad made it attractive and, thereby, created a wide market both inside and outside the country. The silk weaving industry was always more extended than the manufactories of raw silk. The demand and market of the Bengal silk fabrics continued for a long time (i.e., upto to the eighteenth century). But after Plassey, the economic policy of the English Company seemed to turn the silk districts from manufacturing silk cloth to producing raw silk. Malda and Murshidabad were adversely affected by this policy.[119]

The silk weavers of Malda and Murshidabad were also their own dealers. The general rule pursued by them for the disposal of their goods when accumulated was that they went to the nearest towns for sale and what they could not sell they took to the Mahajans, or merchants, or shop-keepers, carrying their goods in their own hands. Sometimes, it was found that a rich weaver secured silk goods from the small weavers and disposed that to the rich merchants. The Mahajans were well acquainted with the quality and price of silk and, so, they always tried to get silks cheap and charged the weavers heavy rate of interest 12-36% per annum for the advance. The weavers had to depend on the Mahajans or money lenders for advance for the purchase of

thread and the support of their families. The Mahajans also supplied thread to the weavers for making pieces of cloth and the weavers got nothing but only wages. The average income of a silk weaver was 4 to 6 annas a day i.e., 8 to 12 rupees a month. The silk weaving industry was controlled by the Mahajans (i.e. the rich money lenders) and the growth of the silk industry was greatly impeded by their grabbing policy. These Mahjans were not interested in silks, in particular, they were interested in the business of jewellery and grain. Besides, they liked to invest money on land.[120] Fortunately, there was another trading community in silk and they were the silk merchants both European and Indian. The silk merchants were interested in the development of the silk industry and they pursued a liberal policy. They made advances to the weavers and purchased their silk goods at reasonable rates and, moreover, they competed with each other to the benefit of the weavers. At Berhampore, Rampur Boalia, and English Bazar, there were many silk merchants who maintained their business houses, and made purchases for transmission to various parts of India and abroad. The family of Tanti Ram Babu of Berhampur was well-known among the silk-weavers' family. They were famous exporters of silk and became Zamindar. Rai Mukundlal Barman Bahadur was also a rich silk merchant of Berhampur. His firm dealt principally with the Maratha-country. The French firm of Messrs. Louis Payen & Co. also dealt in silk piece goods. Mrityonjoy Sarkar, a talented silk weaver of Mirzapur rose from ignominy to the position of a renowned silk merchant and earned a lot of money through silk trade. He introduced many improvements in the silk weaving industry of Jangipur circle and, therefore, the weavers of Mirzapur recognised him as their master. Bishen Chand Babu and Khetu Babu of Baluchar were both silk merchants and Mahajans and bought up large quantities of silk directly from the weavers.[121]

The silk fabrics manufactured in Malda and Murshidabad were enormous in quantity and always had a great demand, and were exported by the Mahajans and other silk merchants to Calcutta, Benares, Mirzapur, Jaypur, Bombay, Madras, Sind, Central and North-western provinces, Burma, and the countries outside India were Europe, America, Russia etc. The silk fabrics which were not sold at the local hats or periodical fairs were sent outside

by roads, canals and rivers. The Ganges helped Malda and Murshidabad in transporting silks outside. There were one or two shops in English Bazar where silk fabrics were sold. The two principal firms of Benares who had establishments in Malda for purchasing silks were Messrs. Dwarka Das-Raghunath Das and Messrs. Saligram-Jaganath Das. The finest clothes were made at Shibganj in Malda and the best weavers there did not earn more than Rs. 8 to 12 a month. The weavers seldom sold their fabrics to the consumers direct and those who worked on their own capital were in a much more favourable position. But as a class, their economic condition was not good and they were involved in debt. They did not work for themselves. They worked for the silk dealers who supplied them materials and paid them for their labour. The weavers of Kandi sub-division of Murshidabad found silk weaving little profitable and gave it up and took to agriculture. The mahajan machination accounted partly for the decline of silk industry in Bengal.

V

MARKETING MECHANISM :

With the European traders taking interest in silk the intermediaries came to play a significant role and the silk market of Bengal in the eighteenth century was largerly dominated by them. They maintained link between the primary producers and the silk merchants and, thereby, served the need of foreign Companies as well as of the Indian merchants. The Banyans,[122] the Gomastahs, the Dallals and the pykars belonged to the same group of intermediaries and occupied a central place in conducting the silk industry and trade of Bengal.

Banyan:

" A Banyan is a person ... by whom the English gentlemen in general transact all their business. "[123] The banyan was an Indian partner of the foreign silk merchants in India and supplied money to the young writers and officials of the Company for their trade and extravagant habits. They had necessary knowledge about the market and got political protection from the

writers and conducted partnership business on commission basis. The banyans guarded the various transaction of his partner whether Indian or European. They were more or less merchants, rather than intermediaries. Cantoo Baboo, the famous banyan of Warren Hastings, became a notable silk merchant of Kasimbazar and founded Kasimbazar palace and got the title Maharaja from the English East India Company.

The banyans often had to advance money to the young Writers, though the risk was not inconsiderable. Sometimes, the young writers became extravagant and could not pay and the banyans did not get their money. But lending continued on account of the fact that the support of the Writers helped the banyans to establish a mercantile aristocracy. Before Plassey, the banyans were mostly Vaisya caste. But after Plassey the high caste Hindus also took it as a profession. The most famous banyans in the second half of the eighteenth century were Gokul Ghosal, Baranasi Ghosh, Hydaram Banerjee, Akrur Dutt, Monhur Mukherjee and their names frequently occurred in the judicial records of the time.[124]

Gomastah :

The gomastahs are salaried agent and the other intermediaries were commisioned agents, i.e., the persons employed by the Company in the provision of silk-piece-goods whether they are gomastahs paid monthly wages by the Company or dallals paid by the commission at a fixed rate for his goods.[125] The gomastahs were regular employees of the Company and connected with factory administration. Their salary was fixed and sometimes, they were paid commission for inducement. Their position was also the same in the case of private trade and they had hardly any share in the profit and loss of his employer's business. So, the position of the gomastahs was different from that of the dallals and pykars appointed for business transaction in any specific goods. They did not belong to any mercantile community like the banyan. A merchant-cum-banyan was respected more than a gomastah. Nevertheless, the gomastahs were not debarred from enjoying the benefits of trade on his own behalf and on behalf of his employer. Being backed by the power and influence of the Company, they exercised arbitrary power and compelled the weavers to take

advances against their will and after that established a monopoly both upon the workers and their work. "The assent of the poor weaver was not deemed necessary; for the gomastahs, when employed on the Company's investment, frequently make them sign what they please; and upon the weavers refusing to take the money offered, it has been known they have had it tied in their girdles, and they have been sent away with a flogging."[126] The artisans had no legal protection against the fraud and violence by these agents.[127] The agents in their malpractices were always supported by the Residents and junior servants of the Company who were usually deeply engaged in private trade.[128] Gomastahs, "Under the sanction of the Company's name" and "under the pretence of securing an investment for the Company" used to practise the "most unbounded tyranny and extortion on all manufacturers and weavers of silk" for their own selfish ends.[129]

Dallals :

The dallals[130] were brokers. They brought sellers and purchasers to each other and acted as the bridge between the two. They were essentially contact men and information suppliers and received commission if their transaction was successful. As the dallals were commissioned agent, so no capital was necessary for their work. "Many mutasaddis being devoid of capital had chosen the profession of a broker."[131] Hence the dallals or brokers were not traders or manufacturers. They were mainly engaged in contacting sellers and purchasers. Though the dallals were commissioned agents, still they were treated as pariah in the mercantile community.

The Pykars :

The part played by the pykars in running the silk industry and trade of Bengal was no doubt great. They had the direct contact with the silk growers and purchased and collected the cocoons from them. "The cocoons are produced by a lot of people called chassar .... They are purchased by another description of men called the pykars who govern the country collecting them."[132] So the pykars were the linkmen between the cocoon-rearers and the commercial Residents of the Company. The Residents supplied them

money which they advanced to the producers for getting the raw materials. "The agent who comes in the immediate Contact with the Company is a middle man, called pykar to whom advances of cash are made by the Commercial Resident which the pykar circulates among the breeders of silk worms throughout his district."[133] The pykars like the gomastahs were not the salaried employees of the Company. They were trader-cum-contractors and made agreement with the Company to supply cocoons on an agreed price. They travelled from village to village in the muffassil, and purchased cocoons from the cultivators of lands.[134] This made them members of the trading community and distinguished them from the dallals or brokers. The dallals were engaged by their employers to find goods for them and received a small commission for that.[135] The pykars, on the other hand, like the banyans were not the business partners of the Commercial Residents and had no share in the profit or loss. They only collected raw materials according to the agreement and specific order and became the chief supplier of raw silk of Malda and Murshidabad. The pykars were generally independent and had a close contact with the merchants and became the chief supplier of goods for the Company and other European traders who could not penetrate into the lower levels of trade and production.[136]

The functions of the pykars were indispensable for the supply of cocoons and without them it was not feasible for the Company or the the private traders to collect cocoons from the interior areas of Bengal. The chassars were reluctant to sell the cocoons to the filatures established by the Company in the late eighteenth century and, therefore, collection of cocoons was difficult and dependence on the pykars was unavoidable. Hence, the role of the pykars should be judged from the view point of the Company, the private trader and the primary producer.

As the pykars were the dadni merchants, so they received advances from the Company and distributed that to the primary producers on the basis of getting cocoons.

The pykars came from the agrarian society and, therefore, they got the oppurtunity to maintain a constant link with the silk rearers and that helped them a lot in collecting cocoons. Sericulture was costly and the chassars were poor. So, they had to depend upon pykars for money. This borrowing of money, which was in the form of advance, forced them to sell their cocoons to the pykars. The poverty of the chassars made the situation easier for the operation of the pykars. Like the banyans, money lending was also a function of the pykars.[137] Another important function of the pykars was to spread the filature system in Bengal for Italian mode of winding silk. They established a number of new filatures for the diffusion of the new technology. The filatures set up by them met the rising demand of filature silk. Sometimes, they also hired filatures from others and spread technology to distant villages.[138] The pykars collected cocoons from the far-off villages and deposited that to the factories. They guided the rural-urban trade. They were 'itinerant pedlar' engaged in collecting materials from distant villages.[139]

Thus, the intermediaries strengthened the link between the raw-material producing villages and manufacturing centres and, thereby, developed well-populated business towns and silk emporiums like Kasimbazar. The silk industry of Malda and Murshidabad owed much to these intermediaries.

Notes and References :

1. A.N. Kapoor and Shiv Chand, Major Industries of India, Delhi, 1959, PP. 64-65;
Ruma chatterjee, The Tasar Silk Industry and its decline in Bengal and South Bihar (1872-1921), Indian Historical Review, Vol.XVII, Numbers 1-2 (July 1990 & January 1991).

2. O' Malley, Bengal District Gazetteers (Murshidabad), 1914, P.101.

3. N.G. Mukherjee, Hand book of Sericulture, Calcutta, 1899, P.6

4. Nanabati Mahes M, Silk from grub to glamour, Bombay, 1965, PP. 112-113.

5. Ibid. P. 114.

6. Khan Mahammad Mohsin, A Bengal District in Transition : Murshidabad (1765-1793), Dacca, 1973, P.41.

7. One span = 9" (inches).

8. Cubit - a measure by the length of the arm from the elbow to the tip of the middle finger.

9. Milburn, Oriental Commerce, Vol II, London, 1813, P.243;
Walsh, History of Murshidabad, London, 1902, P. 105;
N.G. Mukherjee, Hand book of Sericulture, Calcutta, 1899, P.7.

10. Khan Mahammad Mohsin, op.cit., P.41.

11. Sericultural Mannual 1 mulberry cultivation, FAO of the United Nations, Rome, 1976, P.111.

12. Buchanan, Purnea Report, Patna, 1928,P.404.

13. Ibid. P. 401.

14. Ibid. P. 402.

15. Ibid.

16. Porter George Richardson, A Treatise on the Origin, Progressive Improvement and Present State of the Silk Manufacture, London, 1831, P. 96.

17. Ibid. P. 96

18. Ibid. P. 95.

19. Ibid. P.96.

20. Ibid. P.97.

21. Ibid. PP. 98-99.

22 Ibid. P.102.

23. Ibid.

24. Ibid. P.103.

25. Ibid.

26. Ibid.

27. Ibid. 104.

28. N.G. Mukherjee, Hand book of Sericulture, Calcutta, 1899, PP. 32-33.

29. N.G. Mukherjee, A Monograph on the Silk Fabrics of Bengal, Calcutta, 1903, P. 11.

30. Ibid. P.7.

31. Walsh, History of Murshidabad District, London, 1902, P.108.

32. N.G. Mukherjee, op. cit., P.7.

33. Progs. of the Committee of Circuit at Krishnagore and Cossimbazar, 25th August, 1772, P.171.

34. Letter from Court, 16 March 1768; FortWilliam- Indian House Correspondence, Vol. V, Delhi,1949, P.81.

35. Letter from court, 24 December 1776; FortWilliam - India House Correspondence, Vol.VII, Delhi,1971, P.177.

36. Report of the Proceedings of the East India Company in regard to the Trade , Culture and Manufacture of Raw Silk, London, 1836, P.6.

37. Progs. of the Committee of Circuit - Cossimbazar, 25th August 1772; N.K. Sinha, Economic History of Bengal, Vol. I, Calcutta, 1981, P.194.

38. S. Bhattacharya, East India Company and the Economy of Bengal, Calcutta, 1969, P. 177.

39. K. Glamann, Dutch Asiatic Trade, Copenhagen, 1958, P.123; S. Bhattacharya, East India Company and the Economy of Bengal, Calcutta, 1969, P. 146.

40. R.C. Temple (ed.), The Diaries of Streynsham Master, Vol.2. London, 1911, P.28.

41. H.R. Ghosal, Economic Transition in the Bengal Presidency 1793-1833, Patna University, 1950, p.63.

42. N.G. Mukherji, A Monograph of the Silk fabrics of Bengal, Calcutta, 1903, P.8.

43. Joseph Schober, Silk and the Silk Industry , London, 1930,PP.17-18.

44. Report on Survey of Labour Conditions in Silk Factories in India, Labour Bureau, 1964,P.6.

45. J.H.T. Walsh, History of Murshidabad, London, 1902,P.102.

46. N.G. Mukherji, A Monograph on the silk Fabrics of Bengal, Calcutta, 1903,P.8.

47. Ibid. P.13.

48. Ibid.

49. Ibid.

50. Milburn, Oriental Commerce,Vol.2, London, 1813,P.244.

51. Walsh, op.cit., P.105.

52. 'Joar' - Silk rearing Centres.

53. N.G. Mukherjee, op.cit., P.10.

54. 1 Kahan = 16 pans; 1 pan = 80; So, 1 Kahan = (16X80) = 1280.

55. Ghurras - machans made of bamboos.

56. Shelves - dalas

57. Walsh, op.cit., P.106.

58. Chandraki - it is known in Bengal as talias, chances or fingas.

59. Walsh, op. cit., P.106.

60. A Dictionary of Indian Raw Materials and Industrial Products, Part VIII, C.S.I.R., New Delhi, 1973, P.2.

61. Ibid.

62. Ibid. PP. 2-3.

63. Double Cocoons - two worms jointly formed one cocoon.

64. N.G. Mukherjee, Bird's - eye view of Indian Sericulture, Calcutta, 1907, P.31.

65. Porter George Richardson, Descriptions of Silk worms, London, 1831, PP. 105-119.

66. Tazima Yataro, The Silk worm; an important laboratory tool, Tokyo, 1978, P. 47.

67. C.C. Ghosh, Silk Production and Weaving in India, Calcutta, 1949, P.19.

68. A Dictionary of Indian Raw Materials and Industrial Products, part VIII (C.S.I.R.), New Delhi, 1973, P.4.

69. Tazima Yataro, op.cit., P. 47.

70. C.C. Ghosh, Ibid. P. 19.

71 Tazima Yataro, op. cit., P. 47.

48. Buchanan, District Records of Dinajpore, P.104.

73. J. Geoghegan, Some Account of Silk in India (Calcutta,1872), PP. 12-13.

74. Jameson Pringle, Report on the Diseases of Silk worms in India, Calcutta, 1922, P.9.

75. C.C. Ghosh, op. cit., p.12.

76. Jameson Pringle, op.cit., p. 75.

77. Jameson Pringle, op. cit., p.78.

78. N.G. Mukherji, A Bird's -eye view of Indian Sericulture, Calcutta, 1907, P.31.

79. Ibid.

80. Naicha leaves i.e. leaves gathered from the new plantation.

81. N.K. Sinha, The Economic History of Bengal, Vol.3, Calcutta, 1970,P.9.

82. N.G, Mukherji, A Monograph on the Silk Fabrics of Bengal, Calcutta, 1903, P.13.

83. J.H.T. Walsh, op. cit., P 106.

84. Twenty Five Years of Indian Silk, Bombay,April 1974,Vol.XII, No. 12,P.7.

85. Ibid.

86. Spinning tray or mat i.e. bamboo screens.

87. N.G. Mukherji , - A Monograph on the Silk Fabrics of Bengal,Calcutta, 1903, P.27.

88. Reports and Documents connected with the proceedings of the East India Company in regard to Culture and manufacture of Raw Silk in India, London, 1836,P. 20.

89. N.G. Mukherji, A Monograph on the Silk Fabrics of Bengal, Calcutta, 1903, P.22.

90. Ibid. P.27.

91. Reports and Documents connected with the proceeding of the East India Company in regard to Culture and munufacture of Raw Silk in India, London, 1836, P.IV.

92. 'Novi' = Filature.

93. N.G. Mukherjee, A Monograph on the Silk Fabrics of Bengal, Calcutta, 1903, P.28.

94. Ibid.

95. Ibid. P.29.

96. Ibid. P. 30.

97. Ibid.

98. Ibid. P.36

99. Ibid. P.39.

100. N.N. Banerjee, A Monograph on Dyes and Dyeing in Bengal, Calcutta, 1896, PP.13-18.

101. N.G. Mukherjee, The Silk Industry of Murshidabad, Journal of Indian Art and Industry, Vol.5, (1894), PP. 2-3.

102. N.G. Mukherjee, Bird's -eye view of Indian Sericulture, Calcutta, 1907, P.25.

103. N.G. Mukherjee, A Monograph on the Silk Fabrics of Bengal, Calcutta, 1903,(Introduction).

104. R.C. Dutt, The Economic History of India, Vol. I, Delhi,1963, P.176.

105. N.G. Mukherjee, A Monograph on the Silk Fabric of Bengal, Calcutta, 1903, P.4.

106. Ibid. P.41.

107. Ibid. P.42.

108. Ibid. P.45.

109. Ibid. P.83.

110. J. Geoghegan, - Some Account of Silk in India, (Calcutta, 1872), P.16.

111. IOR Home Misc. 456 (A) PP. 223-86 and Watson, J.F., Textile Manufacture of India (London,1866), PP.66-70.

112. Watson,J.F., Textile Manufacture of India (London,1866), PP.71-72.

113. Buchanan, District Records of Dinajpore, P.300.

114. N.G. Mukherjee, A Monograph on the Silk Fabrics of Bengal (Calcutta,1903), P.83.

115. N.G. Mukherjee, "The Silk Industry of Murshidabad, Journal of Indian Art and Industry, Vol.5,1894,PP.2-3.

116. N.G. Mukherjee, op.cit., P.83.

117. N.G. Mukherjee, op. cit., P.84.

118. Ibid. P.84.

119. J.C. Sinha, Economic Annals of Bengal (London,1927),P.86.

120. Ashin Dasgupta, "The Merchants of Surat C. 1700 -50" in E.Leach and S.N. Mukherjee ed., Elites in South Asia, Cambridge, 1970, P.215.

121. N.G. Mukherjee, A Monograph on the Silk Fabrics of Bengal, (Calcutta, 1903), PP.41-42.

122. 'Banyan' comes from Sanskrit word 'Vanik' means a merchant and merchant's banker.

123. William Bolts, Considerations on Indian Affairs, London, 1772, P.80.

124. N.K. Sinha, The Economic History of Bengal, Vol.I, Calcutta, 1781,P.104.

125. B.T.C. 19th June, 1787.

126. William Bolts, Considerations on Indian Affairs (London,1772), P.193.

127. William Bolts, Ibid.

128. William Bolts, Ibid, P.70.

129. Khan Mahammad Mohsin, A Bengal District in Transition : Murshidabad, 1765-1793, Dacca,1973,P.72.

130. Dallal: It is an Arabic word and comes from 'dall' means 'ne or it directed'.

131. Kaliprasanna Sinha, Hutam Pencher Naksha, Sahitya Parishad Edition, Calcutta,1363 B.S.,P.7.

132. B T C. 24th February, 1787.

133. Report from Select Committee, House of Commons, Vol.10,1831-32, Pt. 2,P.489.

134. The petition of Oudhob Saha and Peero Mali, dated 2nd Sravan, 1234 B.S.; BTC. 17th August, 1827,Pro.no.25.

135. Buchanan Hamilton, Dinajpur Report, P.320.

136. R.C. Temple,(ed.), Diary of Streynsham Master, London,1911, P.14;
S.Chowdhary, Trade and Commercial Organisation in Bengal, Calcutta, 1975,P.75.

137. Gautam Bhadra,'The role of Pykars in the Silk Industry of Bengal', (c.1757-1833), Indian Historical Congress, Aligarh, 1975.

138. Ibid.

139. A.F. Tytlar, Considerations on the present political state of India, Vol.2, London, 1816, P.390.